

69955

Cataclastic Anorthosite

75.9 grams

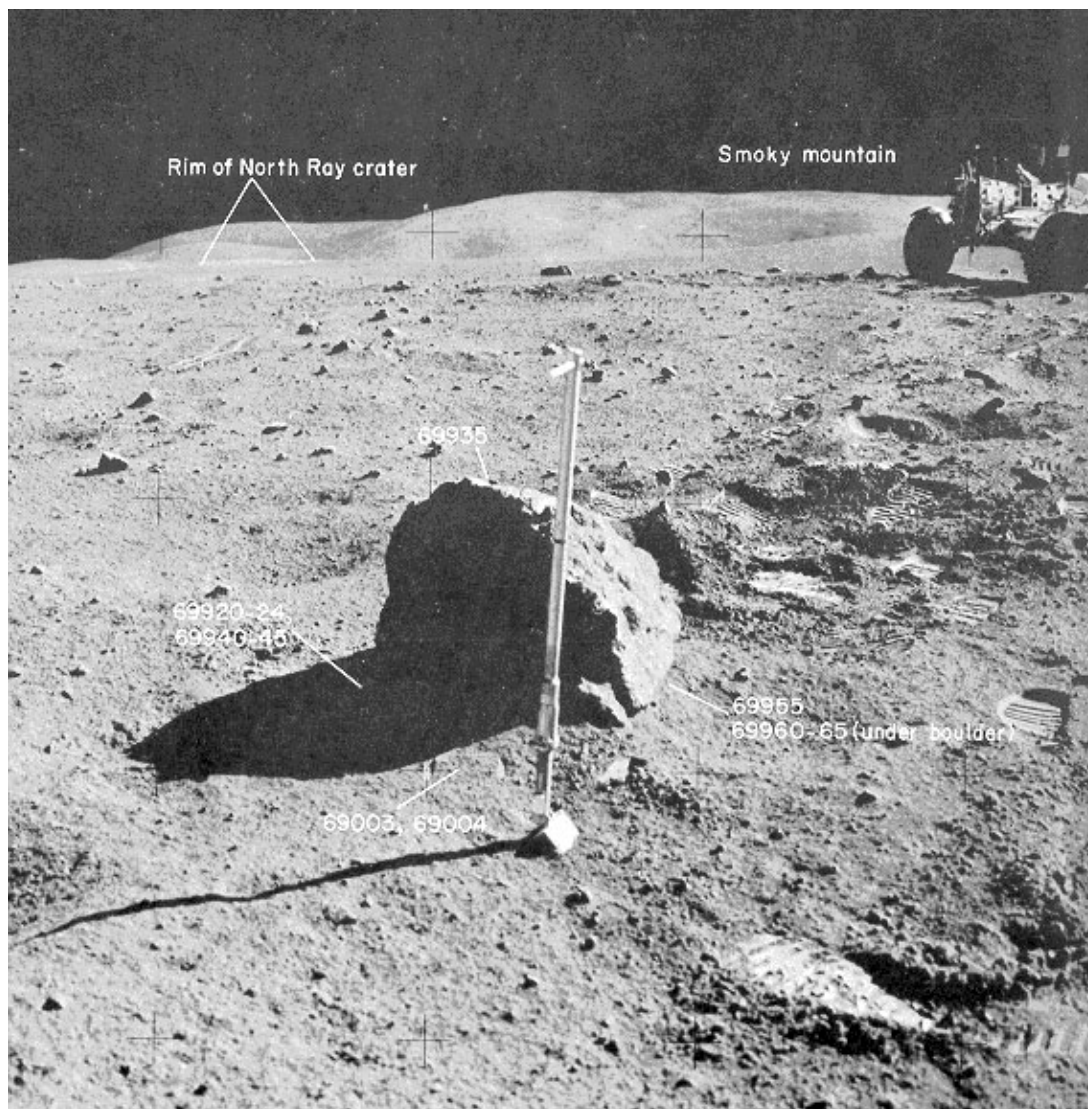


Figure 1: Boulder at station 9, Apollo 16 showing position of samples 69935 (breccia, top) and 69955 (anorthosite, bottom). This boulder is thought to be from South Ray Crater (Sutton 1981), because it is perched, without a fillet, on the regolith. Boulder is about 0.5 meter in size.

### **Introduction**

Lunar sample 69955 was chipped from the bottom of a 0.5 meter-sized boulder found perched on the lunar regolith (Sutton 1981). Hence, 69955 was a clast in a breccia (represented by 69935). This boulder (figure 1) may have been derived from South Ray Crater (Sutton 1981) or secondary craters from the SRC event (Drozd et al. 1974) at about ~ 2 m.y.

### **Petrography**

The only petrographic descriptions of 69955 are those found in the catalogs by Butler (1972) and Ryder and Norman (1980). The sample is almost entirely made of plagioclase (figures 2 and 3). It was noted that the plagioclase had a greasy luster in hand specimen. Mineral analyses are not available.



Figure 2: Photo of 69955. NASA S72-40124. Scale at top is in cm.

Photos show a thin (2mm) flat black glass vein running the length of the sample.

### **Mineralogy**

***Olivine:*** not analyzed

***Pyroxene:*** not analyzed

***Plagioclase:*** Ryder and Norman (1980) reported that some plagioclase was ~ 5 mm across and some maskelynite is present. Meyer (1979) reported trace element analyses of plagioclase.

***Ilmenite:*** not reported

***Metal:*** Misra and Taylor (1975) reported Ni and Co contents of metallic iron in 69955, but they show meteoritic values and may be from the glass vein. Hunter and Taylor (1981) reported trace rust and schreibersite.

### **Chemistry**

Krahenbuhl et al. (1973) showed that 69955 was generally poor in meteoritic siderophiles as well as other trace elements. Analyses by Rose et al. (1973) and Laul and Schmitt (1973) show the rock is almost entirely plagioclase (figure 4).

### **Cosmogenic isotopes and exposure ages**

Drozd et al. (1974) reported cosmic ray exposure ages  $^{81}\text{Kr} = 4.23 \pm 0.21$  and  $^{21}\text{Ne} = 2.13 \pm 0.51$  m.y. Fruchter et al. (1978, 1981) reported the cosmic ray induced activity of  $^{26}\text{Al} = 70$  dpm/kg. and  $^{53}\text{Mn} = 148$  dpm/kg., finding that the radiation history is not consistent with origin of the boulder from South Ray Crater.

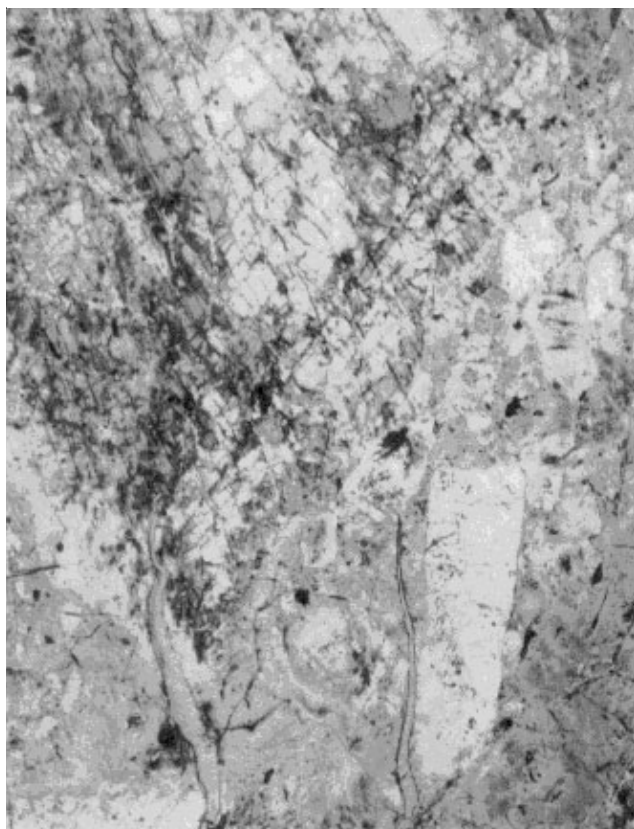


Figure 3: Photomicrograph of thin section 69955,27 (partially crossed polarized light). From Ryder and Norman (1980). Width of field is 2 mm.

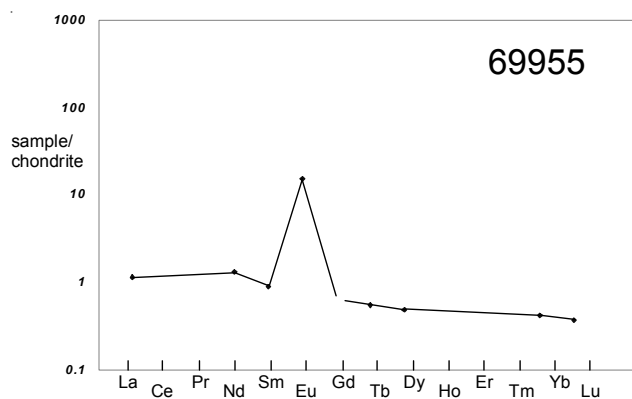
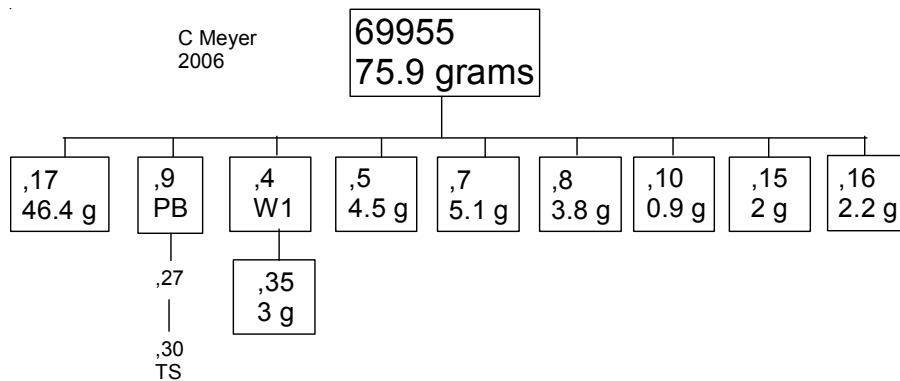


Figure 4: Normalized rare-earth-element diagram for 69955 (data by Laul and Schmitt 1973).



**Table 1. Chemical composition of 69955.**

<i>reference weight</i>	Rancitelli 73 75.8 g	Rose 73	Laul 73 516 mg	Krahenbuhl73	
SiO <sub>2</sub> %		44.1 (b)			
TiO <sub>2</sub>		0.01 (b)	0.04 (c)		
Al <sub>2</sub> O <sub>3</sub>		35.15 (b)	35.5 (c)		
FeO		0.36 (b)	0.49 (c)		
MnO		0.01 (b)	0.011 (c)		
MgO		0.23 (b)			
CaO		19.3 (b)	18.9 (c)		
Na <sub>2</sub> O		0.42 (b)	0.4 (c)		
K <sub>2</sub> O	<0.0108 (a)	0.02 (b)	0.01 (c)		
P <sub>2</sub> O <sub>5</sub>		0.01 (b)			
S %					
<i>sum</i>					
Sc ppm			0.84 (c)		
V			7 (c)		
Cr		350 (b)	48 (c)		
Co			0.8 (c)		
Ni		43 (b)		9.8 (d)	
Cu		1.1 (b)			
Zn				0.37 (d)	
Ga		1.2 (b)			
Ge ppb				22 (d)	
As					
Se				9.8 (d)	
Rb		0.7 (b)		0.15 (d)	(e)
Sr		135 (b)			
Y					
Zr					
Nb					
Mo					
Ru					
Rh					
Pd ppb					
Ag ppb				0.58 (d)	
Cd ppb				37 (d)	
In ppb					
Sn ppb					
Sb ppb				0.21 (d)	
Te ppb				1 (d)	
Cs ppm				0.011 (d)	
Ba		11	10 (c)		
La			0.27 (c)		
Ce					
Pr					
Nd			0.6 (c)		
Sm			0.13 (c)		
Eu			0.87 (c)		
Gd					
Tb			0.02 (c)		
Dy			0.12 (c)		
Ho					
Er					
Tm					
Yb			0.068 (c)		
Lu			0.009 (c)		
Hf			0.024 (c)		
Ta			0.01 (c)		
W ppb					
Re ppb				0.0278 (d)	
Os ppb					
Ir ppb				0.289 (d)	
Pt ppb					
Au ppb				0.307 (d)	
Th ppm	0.14 (a)				
U ppm	0.038 (a)		0.03 (c)	0.026 (d)	
<i>technique: (a) radiation counting, (b) microchemical XRF, (c) INAA, (d) RNAA</i>					



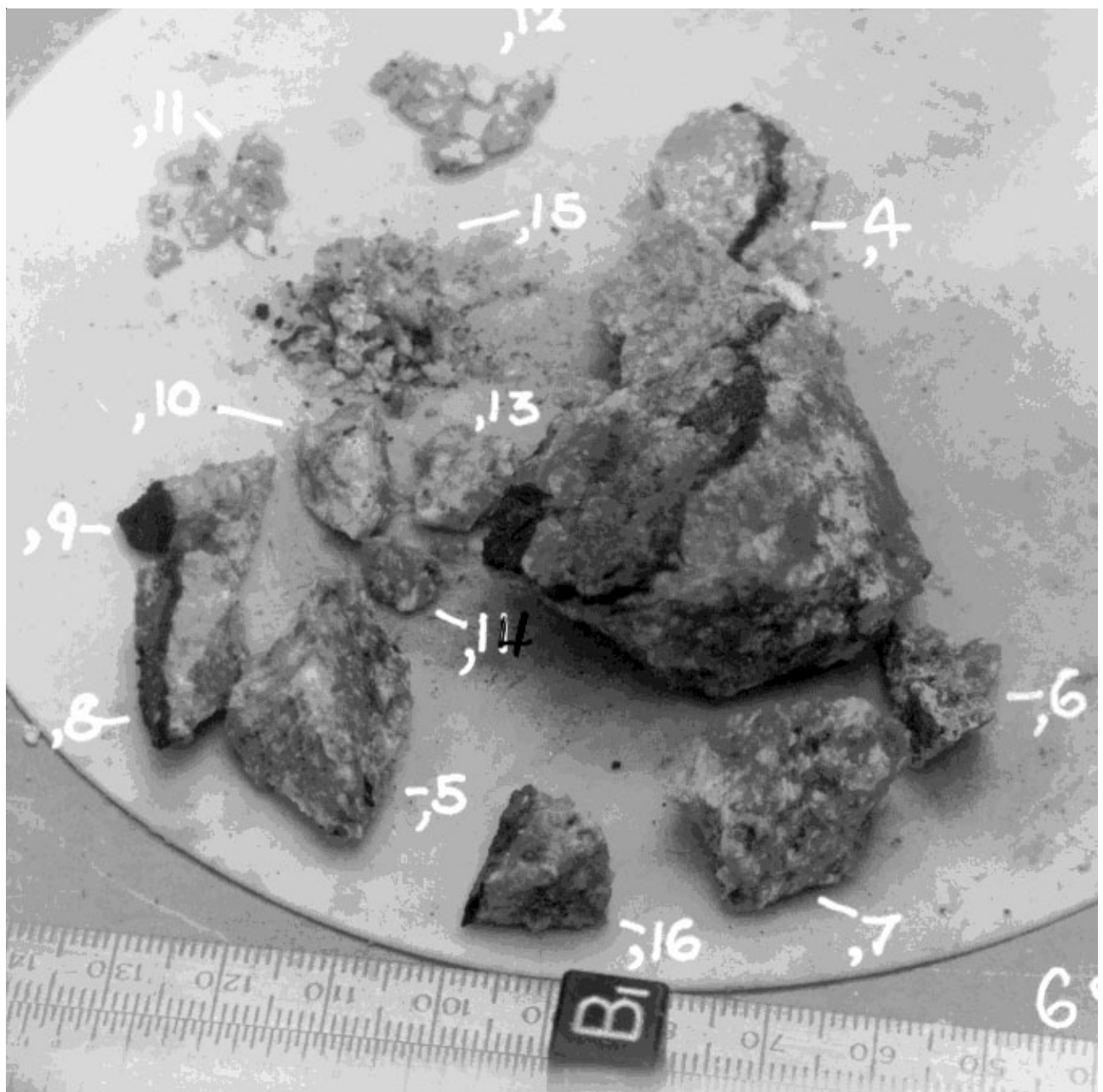


Figure 5: Processing 69955. NASA S73-22189. Cube is 1 cm.